HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

DRAFT

Hatchery Program	Fish First Coho Remote Site Incubator (RSI) Program
Species or Hatchery Stock	Lewis River Hatchery Coho Salmon (*Oncorhynchus kisutch*)
Agency/Operator	Washington Department of Fish and Wildlife
Watershed and Region	Lewis Subbasin/Lower Columbia Province
Date Submitted	nya
Date Last Updated	January 18, 2005

Section 1: General Program Description

1.1 Name of hatchery or program.

Lewis River Coho – Fish First RSI Projects in the Lewis River System

1.2 Species and population (or stock) under propagation, and ESA status.

Coho Salmon (*Oncorhynchus kisutch*)

ESA Status: Fish First RSI programs are included in NOAA's proposed coho listing (NOAA 69 FR 33101; 6/14/2004).

1.3 Responsible organization and individuals.

Name (and title):	Eric Kinne
	Lewis River Hatchery Complex Manager
Agency or Tribe:	Washington Department of Fish and Wildlife
Address:	600 Capitol Way N., Olympia, Wa 98501
Telephone:	(360) 225-6201
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Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program.

Co-operators	Role
PacifiCorp	Mitigation Funding Source
National Marine Fisheries Service	Manager of Mitchell Act Funding Source Relative to Broodstock Supplementation for Mitchell Act Hatcheries
Fish First 4311 Northeast 26 Court, Vancouver, Washington 98663 Contact Person: John DiVittorio Ariel, Washington 98603	Non-Profit Fish Rearing and Salmon Recovery Partners

1.4 Funding source, staffing level, and annual hatchery program operational costs.

Funding Sources
PacifiCorps (Mitigation for Lost Fish Production Due to N.F. Lewis River Hydroelectric Projects) - Total costs only apply to Full-Time Equivalent Staff and Annual Operating Cost for Lewis River Anadromous Fish Programs that are conducted at Lewis River and Speelyai Hatcheries. Costs are cumulative and cannot be broken down for the portion needed to supply 460,000 eggs for the Fish First RSI programs.
Fish First (Non-Profit 501c) In-kind Contributions – Volunteer operational costs are unknown but considerable time and effort and in-kind services are provided by Fish First.

1.5 Location(s) of hatchery and associated facilities.

Broodstock source	Lewis River Hatchery Type N Coho
Broodstock collection location (stream, RKm, subbasin)	Lewis River Hatchery Trap/North Fork Lewis River/RKm 20.9/Lewis; and Merwin Trap/North Fork Lewis River/RKm 25.8/Lewis
Adult holding location (stream, RKm, subbasin)	Lewis River Hatchery Trap/North Fork Lewis River/RKm 20.9/Lewis
Spawning location (stream, RKm, subbasin)	Lewis River Hatchery Trap/North Fork Lewis River/RKm 20.9/Lewis
Incubation location (facility name, stream, RKm, subbasin)	Lewis River Hatchery /North Fork Lewis River/RKm 20.9/Lewis. Eyed eggs are transferred to Fish First - See section 1.11.2 for RSI sites.

1.6 Type of program.

Integrated Recovery

1.7 Purpose (Goal) of program.

To mitigate for the loss of coho salmon stock, due to hydroelectric system development, that would have been produced naturally in tributaries to the North and East Fork Lewis River system. The goal of this program is to supplement the lost natural production in the watershed with Remote Site Incubators (RSI) in conjunction with nutrient enhancement, educational, and habitat restoration efforts.

1.8 Justification for the program.

Currently, NOAA considers Lewis River Hatchery eggs used in the RSI programs to be integrated with historical populations (NOAA Hatchery Listings May 28, 2004). Effects to viable salmonids populations (VSP) attributes including abundance, population growth rate, diversity and spatial distribution are unknown but considered to be of little risk in Lewis River RSI programs (NOAA Fisheries Hatchery Policy and Proposed Updated Listing Determinations, (NOAA 69 FR 33101; 6/14/2004).

The Washington Department of Fish and Wildlife supports the use of unfed fry programs (RSI) in certain areas and under certain specific conditions. WDFW Region 5 staff provides technical

support including siting parameters, operational support and eyed eggs to Fish First's efforts to help re-establish coho populations in the Lewis River system. These projects are part of overall watershed restoration efforts in many of the tributaries RSI projects are located on. RSI programs are described in Washington State Legislative code: CW 77.95.200 "Remote site incubator program" formally RCW 75.50.190 where the goal is to assist the reestablishment of wild salmon and trout populations (see HGMP section 3.2).

Coho eggs from this program are not otolith marked but Fish First's "wild" coho RSI program in Cedar Creek which is a main tributary to the Lewis River are being otolith marked and monitored in conjunction with current wild stock research and monitoring in Cedar Creek (see also Fish First "Wild" Coho RSI HGMP). Results from that effort could be used to measure potential contribution for other RSI programs.

Coho salmon are native to the North Fork and East Fork Lewis River systems although little is known about their historical distribution. Construction of Ariel Dam (1932) created Lake Merwin which blocked all upstream passage to 80% of the historical anadromous habitat in the North Fork Lewis. Historically coho were present all the way to the headwater tributaries of Pine Creek at RKm 94.4 and the Muddy River at RKm 96.0 (Lewis Subbasin Summary (NPPC), DRAFT, May 17, 2002). After dam construction and during the first year of operation, the Ariel Dam trap (RKm 32.0) collected nearly 30,000 coho salmon (TRT, LCR Historical Coho Populations ,unbublished draft, 2003). Natural coho production is presumed to be generally low in most tributaries and current status of Lewis River coho is unknown (**SaSI** 2002, Draft). Coho in the Lewis watershed have been managed for hatchery production, but returning fish will successfully use natural habitat in most areas accessible to coho; coho currently spawn in the North Lewis tributaries below Merwin Dam including Ross, Cedar, NF and SF Chelatchie, Johnson, and Colvin Creeks. Cedar Creek is the most utilized stream on the mainstem (Lewis Subbasin Summary (NPPC), DRAFT, May 17, 2002). Current coho smolt productivity is estimated at only 38% of historical numbers with current high priority coho reaches (preservation and restoration) in many of the Lewis River tributaries having RSI programs in the system up to Ariel Dam (LCFRB Basin Plans 2004).

1.9 List of program "Performance Standards".

See Section 1.10

1.10 List of program "Performance Indicators", designated by "benefits" and "risks".

Benefits		
Performance Standard	**Performance Indicator**	**Monitoring & Evaluation**
Benefits include partnerships and education with local government and local citizens	Fish First coordinates ongoing and future cooperative projects	Volunteer involvement is tracked yearly and total hours committed are recorded.
Augment naturally spawning populations using RSI technology.	Evaluate contribution of wild smolts and adults to the system	WDFW monitors Cedar Creek populations
RSI programs operate per Cooperative Fish and Wildlife Project Memorandum of Understanding Fish Production Agreement	Cooperator reviews and submits MOU to WDFW for each year involved in the project.	WDFW compiles MOU and manages volunteer and partnership program reporting procedures
Individual RSI programs sites are highly successful at hatching eggs and swim-up fry.	RSI programs achieve a 95% eyed egg to hatch and 90% swim-up survival rate.	Cooperator submits yearly WDFW Volunteer Fish production Project Release and Planting Record Form that includes details on success of program. WDFW reviews and recommends changes if needed.
RSIs minimize impacts and/or interactions to ESA listed fish. See also Risks below.	Individual RSI projects and numbers of eggs incubated are consistent with the WDFW FBD.	Cooperator submits yearly WDFW Volunteer Fish production Project Release and Planting Record Form that includes details on fish released, date of releases and location of projects.
Risks		
Performance Standard	**Performance Indicator**	**Monitoring & Evaluation**
Augment naturally spawning populations using RSI technology.	Evaluate contribution of wild smolts and adults to the system	WDFW monitors Cedar Creek populations
Minimize impacts and/or interactions to ESA listed fish	RSI projects and numbers of eggs incubated are consistent with the WDFW FBD	FBD is reviewed annually by WDFW Staff for stock, size, number, date of release and location of projects.
RSI units operate in compliance with all applicable fish health protocols.	Egg/Fish health documented. Goal is to prevent the introduction, amplification or spread of fish pathogens that might negatively affect the health of both hatchery and naturally reproducing stock.	RSI Project leads and coordinators communicate regularly with Region 5 staff. Dead eggs are removed and disposed of properly to prevent fungal incidence (*Saprolegniasis).*
Ensure RSI operations comply with state and federal water quality and quantity standards through proper environmental monitoring	MOU Section 4. The Cooperator shall also be responsible for obtaining and complying with any and all necessary permits to conduct the project(s) described in the attached Exhibit(s), which may include but are not limited to: Hydraulic Project Approvals (HPA), State Environmental Protection Act checklist (SEPA), National Pollution Discharge Elimination System (NPDES) Water Rights local	The Cooperator complies with all permits required and submits MOU to WDFW for each year involved in the project before project is approved.

	construction, grading, or filling permits, etc, with the exception of federal ESA compliance, which can only be deferred upon WDFW or the Treaty Tribes of Washington. MOU Section 4. The Cooperator shall also be responsible for obtaining and complying with any and all necessary permits to conduct the project(s) described in the attached Exhibit(s), which may include but are not limited to: Hydraulic Project Approvals (HPA), State Environmental Protection Act checklist (SEPA), National Pollution Discharge Elimination System (NPDES), Water Rights, local construction, grading, or filling permits, etc, with the exception of federal ESA compliance, which can only be deferred upon WDFW or the Treaty Tribes of Washington.	
Water useage and in-stream water diversion structures for RSI will not affect spawning behavior of natural populations or impact juveniles.	WDFW staff provides technical site evaluation and operational support to minimize impacts of RSI water intakes (PVC pipe intake) or screen material for floating RSIs.	The Cooperator submits yearly WDFW Volunteer Fish production Project Release and Planting Record Form that includes details success or operational concerns.

1.11.1 Proposed annual broodstock collection level (maximum number of adult fish).

Up to 3,400 adults at a 1:1 female to male ratio can be collected from Lewis River Hatchery for the total hatchery program goals. Out of that total, approximately 150 pairs (approximately 3,200 eggs fecundity) are used to secure 460,000 eyed eggs needed for this program.

1.11.2 Proposed annual fish release levels (maximum number) by life stage and location.

Age Class	Max. No.	Size (ffp)	Release Date	Location		
				Stream (LLID)*	Tributary Location	Eco-province
* Latitude- Longitude Identification (LLID - WDFW Salmon Scape)						
Swim up fry	50,000	1,500	April	Hayes Cr. (1227088459308)	Left Bank tributary -Enters N.F. Lewis at Rkm 17.6	Lower Columbia
Swim up fry	10,000	1,500	April	Allen Cr. (1227486458646)	Left Bank tributary -Enters Mainstem Lewis below I-5 at RKm 3.0	Lower Columbia

Swim up fry	50,000	1,500	April	Colvin Cr. (1226071459392)	Right Bank tributary- Enters North F. Lewis At RKm 26.0	Lower Columbia
Swim up fry	50,000	1,500	April	Staples Cr. (1226690459377)	Right Bank tributary- Enters North F. Lewis At RKm 18.9	Lower Columbia
Swim up fry	50,000	1,500	April	Davis Cr. (1226787459386)	Right Bank tributary- Enters North F. Lewis At RKm 17.9	Lower Columbia
Swim up fry	50,000	1,500	April	Houghton Cr. (1226686459390)	Right Bank tributary- Enters North F. Lewis At RKm 19.5	Lower Columbia
Swim up fry	50,000	1,500	April	Johnson Cr. (1226254459358)	Right Bank tributary- Enters North F. Lewis At RKm 24.3	Lower Columbia
Three (3) RSIs are located on the E.F.Lewis River						
Swim up fry	50,000	1,500	April	Stoughten Cr.* (Rolers Bottom) Beasely Cr. (1226437458415)	Right Bank tributary- Enters East F. Lewis At RKm 8.8	Lower Columbia
Swim up fry	50,000	1,500	April	Lockwood Cr. (1226555458508)	Right Bank tributary- Enters East F. Lewis At RKm 7.2	Lower Columbia
Swim up fry	50,000	1,500	April	Riley Cr. (1226327458555)	Right Bank tributary- Enters Lockwood Cr. At RKm 2.1	Lower Columbia
* In 2004, the RSI program in Stoughten Creek was moved to Beasley Creek (1226347458413), which is a tributary to Stoughten Creek (Gary Loomis pers. Comm. 2004).						

1.12 Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.

Program performance for the incubation and operational success of these projects are based on expectations that RSI programs should exceed 90% eyed-egg to swim-up fry success. Smolt productivity or adult contribution from this program are not known because eggs are not otolith

marked nor monitored at this time.

While RSIs in this program are not otolith marked, the wild coho eggs used in RSIs in Cedar Creek system are marked which could give some idea of contribution. Cedar Creek is the major spawning tributary for the Lewis River (Lewis Subbasin Summary (NPPC), DRAFT, May 17, 2002). Recent WDFW smolt monitoring work on otolith marked RSI coho eggs in Cedar Creek, indicates RSI contributions in 2002 of a .275% (eyed egg to smolt survival) equating to 1,100 smolts (approximately 2.98% of the captured run) from the 400,000 egg RSI program in that system This does not include potential contribution from fry or fingerlings that migrated out of the tributaries before or after the sampling period and reared to smolt stage in other areas in the N.F. or mainstem Lewis River. Contribution estimates could be based on the Cedar Creek research if the productivity of the tributaries in this program were similar.

1.13 Date program started (years in operation), or is expected to start.

The Fish First RSI program began in 1999 when eight egg boxes released 80,000 fry.

1.14 Expected duration of program.

On-going program until monitoring can determine that self-sustaining population densities are achieved or the programs are re-evaluated by fisheries co-managers in Washington.

1.15 Watersheds targeted by program.

Lewis Subbasin/Lower Columbia Province

1.16 Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.

1.16.1 Brief Overview of Key Issues

Fish First is using remote site incubators to seed habitat areas in conjunction with nutrient enhancement in NF Lewis tributaries. This program should be continued until self-sustaining population densities are achieved, but without monitoring and evaluation, it will be difficult to determine when this is achieved. WDFW would review new proposals for RSIs and require that any additional sites or increase in numbers of eggs follow Future Brood Document (FBD) policy review submittal.

1.16.2 Potential Alternatives to the Current Program

Alternative 1: Release the trapped wild coho adults into the tributaries so they can naturally seed the habitat. The success of this alternative would need to be examined to determine if it is viable.

Alternative 2. Discontinue this program. The wild fish will utilize the habitat improvements and the population will increase over time. It is unknown if the wild coho returning to these tributaries are any where near carrying capacity.

1.16.3 Potential Reforms and Investments

Reform/Investment 1: Monitoring and evaluation of the interaction, production, and the carrying capacity of listed species in these tributaries should be implemented.

Reform/Investment 2: Handling and hauling equipment is needed. Volunteers provide extensive work and equipment.

Section 2: Program Effects on ESA-Listed Salmonid Populations

2.1 List all ESA permits or authorizations in hand for the hatchery program.

This RSI program is part of the Lewis Hatchery Cooperative projects as identified in the Biological Opinion on Artificial Propagation in the Columbia River Basin (NMFS, 1999).

2.2 Provide descriptions, status and projected take actions and levels for ESA-listed natural populations in the target area.

2.2.1 Descriptions of ESA-listed salmonid population(s) affected by the program

Identify the ESA-listed population(s) that will be directly affected by the program.

Coho salmon within the Lower Columbia River/Southwest Washington Evolutionary Significant Unit (ESU) were proposed as threatened under the federal Endangered Species Act in 2004. Eggs for the RSI programs are included in the proposed listing for the Lower Columbia ESU (NOAA 69 FR 33101; 6/14/2004).

Identify the ESA-listed population(s) that may be <u>incidentally</u> affected by the program.

Lower Columbia River fall chinook salmon *(Oncorhynchus tshawytsch*a) are federally listed as "threatened" under the ESA on March 24, 1999.
Lower Columbia River Steelhead *(Oncorhynchus mykis*s), were listed as threatened under the ESA on March 19, 1998. In Washington, the LCR steelhead ESU includes winter and summer steelhead in tributaries to the Columbia River between the Cowlitz River and Wind River.
Columbia River chum salmon *(Oncorhynchus ket*a) - Mainstem Chum were listed as threatened under the ESA on March 25, 1999.
Columbia Basin DPS Bull Trout *(Salvelinus confluentus)* were listed as threatened on June 10, 1998 (63 FR 31647).

2.2.2 Status of ESA-listed salmonid population(s) affected by the program

Describe the status of the listed natural population (s) relative to "critical" and "viable" population thresholds. The following species exist in the immediate target area. Planning goals and population thresholds have been established for these ESUs and the populations within them (LCFRB Basin Plans 2004). Projected take actions or levels of take on listed fish are unknown.

Lower Columbia River Coho (*Oncorhynchus kisutch*) proposed as threatened on June 14, 2004.
Status: Coho historically spawned throughout the basin. Natural spawning is thought to occur in most areas accessible to coho; coho currently spawn in the North Lewis tributaries below Merwin Dam including Ross, Cedar, NF and SF Chelatchie, Johnson, and Colvin Creeks; Cedar Creek is the most utilized stream on the mainstem. As part of the current hydro re-licensing process, reintroduction of coho into habitat upstream of the three dams (Merwin, Yale, and Swift) is being evaluated. The Lewis River wild coho run is a fraction of its historical size. Currently, hatchery production accounts for most coho returning to the Lewis River and natural coho production is presumed to be generally low in most tributaries except for the Cedar Creek system . A smolt trap at lower Cedar Creek has shown recent year coho production to be fair to good in North and South forks of Chelatchie Creek (tributary of Cedar Creek) and in the mainstem Cedar Creek. Coho in the Lewis watershed are managed for hatchery production, but some returning hatchery fish will successfully use natural habitat. Fish First coho programs including restoration, nutrient enhancement and RSI programs have concentrated efforts in the NF and EF Lewis River system.

Lower Columbia River spring chinook salmon *(Oncorhynchus tshawytsch*a)
At one time, an indigenous stock of spring chinook existed in the Lewis River, but with the construction of Merwin Dam (RM 19.5) in 1931, the majority of the spawning reaches became inaccessible and the stock subsequently declined. Early attempts to save the stock through hatchery production failed. By 1950, only a remnant population existed in the river, spawning primarily in the waters immediately below Merwin Dam and Cedar Creek. In 1971 managers introduced the Carson Hatchery stock, which originated from Bonneville Dam fish way. These fish were reared and released from Speelyai Hatchery. Since then, releases have been made from the Lewis River hatchery. The stocks used now include Cowlitz and Kalama, along with on-station returns to the Lewis River. The 1977 through 1987 average run size to the Lewis River is estimated at about 6,000 fish, with about 10 percent of the returns constituting jacks. Annual returns during this time period have ranged from about 2,300 adults in 1980 to nearly 17,000 adults in 1987. Natural escapement of adult fish, based on annual spawning ground counts, have averaged about 1,400 adults, ranging from just over 300 to nearly 7,000 adults.

Lower Columbia River fall chinook salmon *(Oncorhynchus tshawytsch*a) In Washington, the LCR chinook ESU includes all naturally spawned chinook populations from the mouth of the Columbia River to the Cascade Crest. As defined by harvest management units, there are four stocks of fall chinook that return to the Columbia River. These include the lower river hatchery (LRH), lower river wild (LRW) , Bonneville Pool Hatchery (BPH) and the upriver brights (URB**).** The North Lewis wild fall chinook represent about 80 percent of the wild fall chinook returning to the lower Columbia River, (Norman, 1987). LRW fish also return to the East Fork Lewis. In addition, LRW fish are also found in the Cowlitz and Sandy rivers. After brood year 1985, no hatchery production has taken place. Current production is entirely natural. Natural spawning over the last 10 years has ranged from about 5,300 to 19,000 adults. Escapement estimates are based on peak fish counts, which are used as an index to estimate total spawners. The majority of the spawning takes place within the 4- mile stretch between the Lewis River Hatchery and Merwin Dam, in addition to Cedar Creek. Surveys are also conducted in the East Fork Lewis River within the 4.2-mile stretch from the area of Lewisville Park to Daybreak Park.

Lower Columbia River steelhead *(Oncorhynchus mykis*s), were listed as threatened under the ESA on March 19, 1998. In Washington, the LCR steelhead ESU includes winter and summer steelhead in tributaries to the Columbia River between the Cowlitz River and Wind River. No total estimates of wild run size or escapement exist for either the North or East Fork Lewis River. Smoker et al. (1951) believed that combined winter and summer runs of native steelhead on the North Fork above Merwin Dam formerly exceeded 1,000 adults. Lucas (1985) determined that the wild component of winter steelhead at Lucia Falls averaged 56% (ranged 35-74 percent) of the creeled fish between 1973 and 1984. Adult winter steelhead enter the basin from November through May with peak migration occurring in January and March for hatchery and wild fish, respectively. Spawning occurs from March through June in both the North and East forks (Howell et al. 1985). Lucas and Pointer (1987) found that peak spawning during the 1987 brood year in the East Fork occurred from mid-March through late April. Most wild North Fork smolts probably outmigrate in April and May at a size of 160 mm (Lavoy and Fenton 1983).

Columbia Basin DPS Bull Trout *(Salvelinus confluentus)* were listed as threatened on June 10, 1998 (63 FR 31647). The Columbia River Distinct Population Segment is threatened by habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, and past fisheries management practices such as the introduction of non-native species. The Lower Columbia Recovery Unit Team identified two core areas (Lewis and Klickitat rivers) within the recovery unit. Generally, in drainages colonized by anadromous salmon and steelhead, char successfully co-exist by occupying a different ecological niche. Known bull trout habitat is in the upper Lewis River basin above the dams. Cougar Creek is the only tributary to Yale Reservoir

where bull trout are known to spawn. The Yale Reservoir Sub-Population contains a low number of fish, coming dangerously close to extinction. PacifiCorp has been conducting bull trout spawner counts on Cougar Creek since 1978. The estimated Cougar Creek spawner population ranges from zero to 40 individuals (PacifiCorp and Cowlitz PUD 1999a, 100% Initial Information Package). Pine and Rush creeks are believed to be the principal spawning tributaries supporting the Swift Reservoir Sub-Population (Faler and Bair 1996). A cooperative monitoring effort began in the early 1990s on the Swift Reservoir Sub-Population. The primary cooperators include the Washington Department of Fish and Wildlife, PacifiCorp, and U.S. Forest Service. In the early 1990s, radio-tagging of adult bull trout was conducted to determine distribution of spawners. Beginning in 1994, population size estimates have been made on an annual basis using a visual mark-recapture method.

Columbia River chum salmon *(Oncorhynchus keta*) Mainstem Chum within the lower Columbia River Evolutionary Significant Unit (ESU) are federally listed as threatened effective May 24, 1999).

Status: Very little is known about the life history of chum in the North Fork Lewis River. Chum were sighted occasionally during 1998 fall Chinook spawning surveys and 4 adult carcasses were observed in Cedar Creek (Hawkins 1999 personal comm.). In addition, about 45 juvenile chum were captured during seining operations related to a smolt residual study in 1998 (R2 Resources). Annually, about 3 or 4 adult chum have also been captured at the Merwin fish trap (R2 Resources 1999). Lewis River chum salmon are included in the Columbia River ESU and this population was listed by NMFS as "threatened" under the ESA on March 25, 1999. The 2002 **SaSI** lists information on only the Grays River, Hardy Creek, and Hamilton Creek stocks for the lower Columbia. Chum salmon populations in the other river systems of the lower Columbia have not been monitored as populations are extremely low (Hawkins 1999 personal comm.).

2.2.3 Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed fish in the target area, and provide estimated annual levels of take.

Hatchery activities are identified in the ESA Section 7 Consultation "Biological Opinion on Artificial Propagation in the Columbia River Basin" (March 29, 1999). All activities accept for take of listed broodstock cannot be quantified.

1) Broodstock Collection: Broodstock for RSI programs are collected at Lewis River Hatchery (see Lewis River Hatchery HGMPs). Take for proposed coho if they are listed are located at the end of the HGMP.

2) Operation of Hatchery Facilities: All RSI units are temporally sited barrel incubators which are situated on firm ground adjacent to the stream. The site is chosen to provide protection from high instream flows and provide a secure water flow via a gravity fed PVC pipeline. An outlet overflow pipe leads from the RSI unit back to the stream and allows volitional release of swim up fry. RSIs are used for approximately 2-3 months, then dismantled and removed from the area after fry have vacated the unit. A Cooperative Fish and Wildlife Project Memorandum of Understanding Fish Production Agreement for the Fish First RSI projects are used as a condition of operation with cooperative programs for impacts except ESA compliance. The water intakes are screened to keep debris or listed fish from entering the unit.

3) Genetic introgression: Wild coho are present in the Lewis River system although other than Cedar Creek, utilization by individual tributary streams is not known. For the future, WDFW is proposing to integrate Lewis River coho programs which would include eggs used for the Fish First RSI programs. Type N coho populations are typically later returning, a potential advantage for upstream migration during fall rains stream recharging. Indirect take from genetic

introgression is unknown.

4) Hatchery Production/Density-Dependent Effects: RSI units can hatch and produce up to 95% swimup fry from the units compared to wild spawning and swimup rates of 5-20% depending on habitat. By applying smolt contribution as seen on Cedar Creek research, individual RSIs could contribute smolts to individual tributaries (.275% eyed egg to smolt contribution). It is unknown what impacts would be on the present total smolt production in the Lewis River system estimated at 54,883 (EDT LCFRB Basin Plans 2004) Indirect take due to hatchery density dependent effects is unknown.

5) Disease: Eyed eggs have been incubated at Lewis River hatchery under IHOT Fish Health guidelines. Eyed eggs have been shocked and picked before being transferred to the RSI sites. Fish First staff regularly remove dead eggs from the RSI units to prevent fungal spread (*Saprolegniasis)* from dead eggs to healthy eggs. Indirect take from disease is unknown.

6) Competition: RSI incubation techniques can have egg-to-fry survival rates of well over 95%, a significant increase over values reported for naturally incubated eggs. Releasing un-fed fry into reduced rearing habitat (due to reduced summer flows, etc) could increase competition for food and habitat. RSI programs are placed in areas that need re-seeding and where wild fry competition would be minimal. Indirect effects on listed fish is unknown.

7) Predation: Coho egress from the RSI at approximately 1,500 fpp (30-35 mm fl) starting in March-April. Coho fry from the RSI program pose no known predatory risk to listed salmonids during the first year of rearing. During their yearling stage they pose an unknown predatory risk to listed fish <40mm fl. In Cedar Creek, smolt trapping data (March-Jun, 2003) indicated the average size of wild coho smolt emigrating past the trap to be 121 mm fl (90-198 mm fl). Research on RSI produced coho in Snow and Andrews Creeks on the Olympic Peninsula (WDOT, 2002) indicated that coho ranged from 36-40 mm fl in April to 40-55mm fl in May to 60 mm fl in June. Smolted coho captured during this study (May) ranged from 80-105mm fl. Indirect take from predation is unknown.

8) Dates of Releases: Coho fry egress from the RSI's beginning in late March and could continue through April. By the end of April, RSIs are empty and removed for the year.

9) Residualism: It is unknown if residualism occurs with these programs since they are only hatched out and then egress as unfed fry.

10) Migration Corridor/Ocean: It is unknown due to the small number of eggs and fish involved with this program if there is any impact in the migration corridor or ocean.

Associated Monitoring Activities – Wild stock research, monitoring and evaluation is ongoing for Cedar Creek and its tributaries although not for individual tributaries in this HGMP. The following monitoring activities are also conducted in the Lower Columbia Management Area (LCMA) for adult steelhead and salmon. Included are redd surveys conducted for winter steelhead in the SF Toutle, Coweeman, EF Lewis and Washougal rivers. Redd surveys are also conducted in the Cowlitz River for fall and spring chinook. Mark-recapture carcass surveys are conducted to estimate populations of chinook salmon in Grays, Elochoman, Coweeman, SF Toutle, Green, Kalama, NF Lewis, EF Lewis rivers and Skamokawa, Mill, Abernathy, and Germany creeks and for all chum salmon populations. Snorkel surveys are conducted for summer steelhead in the EF Lewis and Washougal rivers. Trap counts are conducted on the Cowlitz, NF Toutle, Kalama, and Wind rivers and on Cedar Creek, a tributary of the NF Lewis River. All sampling of carcasses and trapped fish include recovery of coded wide tagged (CWT) fish for hatchery and wild stock evaluation. Any take associated with monitoring activities is unknown but all follow scientific protocols designed to minimize impact.

Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken, and observed injury or mortality levels for listed fish.
See take tables at the end of this document.

Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).
See take tables at the end of this document.

Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.
Take levels will not exceed levels described in this plan. The amount of adults taken for this program is set through the FBD process.

Section 3: Relationship of Program to Other Management Objectives

3.1 Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. *Hood Canal Summer Chum Conservation Initiative*) or other regionally accepted policies (e.g. the *NPPC Annual Production Review* Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.

The production developed for this program will be integrated with *U.S. v Oregon* and the Columbia River Fish Management Plan (CRFMP) and with hatchery plans documented in WDFW's yearly Future Brood Document (FBD), and Lower Columbia Fisheries Management and Evaluation Plan (2002 FMEP) which has been agreed to by NOAA for listed steelhead, chum, and chinook in the ESU. Fisheries in the Columbia River are managed under *U.S. v Oregon* and the Columbia River Fish Management Plan (CRFMP). The CRFMP defines the roles of harvest and production in the Columbia River basin, including the Snake River. The CRFMP has expired and the parties to *U.S. v Oregon* are in the process of renegotiating the plan. According to the schedule a new plan is supposed to be finalized by March 2004.

Cooperative programs are aligned though hatchery programs and these RSI programs are intended to integrate with restoration and nutrient enhancement programs in the Lewis River watershed. The Lewis River Hatchery provides the eggs for these programs and adheres to a number of guidelines, policies and pemit requirements in order to operate. These constraints are designed to limit adverse effects on cultured fish, wild fish and the environment that might result from hatchery practices. The following is a list of guidelines, policies and permit requirements that govern WDFW Columbia River hatchery operations:

Genetic Manual and Guidelines for Pacific Salmon Hatcheries in Washington. These guidelines define practices that promote maintenance of genetic variability in propagrated salmon (Hershberger and Iwamoto 1981). Also, *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Genetic Policy Chapte 5, IHOT 1995).

Spawning Guidelines for Washington Department of Fisheries Hatcheries. Assembled to complement the above genetics manual, these guidelines define spawning criteria to be use to maintain genetic variability within the hatchery populations (Seidel 1983). Also, *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Genetic Policy Chapter 7, IHOT 1995).

Stock Transfer Guidelines. This document provides guidance in detemining allowable stocks for release for each hatchery. It is designed to foster development of locally-adapted broodstock and to minimize changes in stock characteristics brought on by transfer of non-local salmonids (WDF 1991).

Fish Health Policy in the Columbia Basin. Details hatchery practices and operations designed to stop the introduction and/or spread of any diseases within the Columbia Basin. Also, *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (Genetic Policy Chapter 5, IHOT 1995).

National Pollutant Discharge Elimination System Permit Requirements This permit sets forth allowable discharge criteria for hatchery effluent and defines acceptable practices for hatchery operations to ensure that the quality of receiving waters and ecosystems associated with those waters are not impaired.

3.2 List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.

Cooperative Fish and Wildlife Project Memorandum of Understanding (MOU) Fish Production Agreement:
A Cooperative Fish and Wildlife Project Memorandum of Understanding Fish Production Agreement is used to monitor volunteer cooperative programs. Amoung the important operational concerns, the Cooperator is responsible for: a) obtaining permission to work on private property; b) maintaining a list of volunteer workers and their hours of work; and c) submitting completed annual planting slips to the Department within 30 days of release. The Cooperator shall also be responsible for obtaining and complying with any and all necessary permits to conduct the project(s) described in the attached Exhibit(s), which may include but are not limited to: Hydraulic Project Approvals (HPA), State Environmental Protection Act checklist (SEPA), National Pollution Discharge Elimination System (NPDES), Water Rights, local construction, grading, or filling permits, etc, with the exception of federal ESA compliance, which can only be deferred upon WDFW or the Treaty Tribes of Washington.

RSI Programs in Legislative code:
RSI programs described are in Legislative code: CW 77.95.200 "Remote site incubator program" formally RCW 75.50.190. The legislature finds that trout and salmon populations are depleted in many state waters. Restoration of these populations to a healthy status requires improved protection of these species and their habitats. However, in some instances restoration of self-sustaining populations also requires the reintroduction of the fish into their native habitat. Remote site incubators have been shown to be a cost-effective means of bypassing the early period of high mortality experienced by salmonid eggs that are naturally spawned in streams. In addition, remote site incubators provide an efficient method for reintroduction of fish into areas that are not seeded by natural spawning. The technology for remote site incubators is well developed, and their application is easily accomplished in a wide variety of habitat by persons with a moderate level of training. It is a goal of the remote site incubator program to assist the reestablishment of wild salmon and trout populations that are self-sustaining through natural spawning.

Cooperative agreements also include the production under Lewis Hatchery:

- Pacific Corp Mitigation Agreements
- The Columbia River Fish Management Plan
- U.S. vs. Oregon Court Decision
- Production Advisory Committee (PAC)
- Technical Advisory Committee (TAC)
- Integrated Hatchery Operations (IHOT) Operation Plan (1995) Vol. III
- Pacific Northwest Fish Health Protection Committee (PNFHPC)
- In-River Agreements: State, Federal and Tribal Representatives
- Northwest Power Planning Council Subbasin Plans

3.3 Relationship to harvest objectives.

Fish are not marked in any way to contribute to harvest objectives. Any adults produced from the RSI programs would be protected by harvest rules on wild coho. There is no sport salmon harvest in tributary creeks.

3.4 Relationship to habitat protection and recovery strategies.

The Washington Department of Fish and Wildlife supports the use of unfed fry programs only in certain areas and under certain specific conditions. The areas where RSIs are most likely to be appropriate are streams historically inhabited by the juvenile fish of the species of interest, but where they are not currently present or have lost useable habitat. In some cases, RSIs are used in stream areas with partial or significant passage barriers.

Identification of limiting factors in WRIA 27 including fish passage barriers have been identified in the salmon habitat limiting factors report (LFA) completed by the Washington State Conservation Commission (Wade, 2001). Fish passage upgrades and riparian projects for Lewis River watershed have been accomplished on a number of tributaries with the RSI programs. Several more projects are in the planning and design phases by Clark County Public works and the Washington Department of Transportation. The Lower Columbia Fish Recovery Board, which encompasses five counties in the Southwest Washington Region, also competes for Salmon Recovery Funding Board restoration dollars to fund or provide match for these projects.

In the Lewis River system, HGMP processes are designed to deal with existing hatchery programs and potential reforms to those programs. A regional sub-basin planning process (Lewis Subbasin Summary (NPPC), DRAFT, May 17, 2002, Final May 2004) is a broad-scale initiative that will provide building blocks to recovery plans developed by the Lower Columbia Fish Recovery Board for listed fish. It may use HGMP alternative ideas on utilizing hatchery programs to achieve objectives and harvest goals. In order to assess, identify and implement restoration, protection and recovery strategies, Region 5 staff is involved in fish and wildlife planning and technical assistance in concert through the LCFRB. This collaborative process involves federal, state, tribal, and local governments and is coordinated by the LCFRB for the preparation of a Lower Columbia salmon recovery and fish and wildlife sub-basin plan. WDFW is both a technical resource and resource manager and under the work program, LCFRB is contracting with WDFW for technical and planning assistance in both recovery and sub-basin planning work.

3.5 Ecological interactions.

Below are discussions on both negative and positive impacts relative to the Lewis River coho programs and are taken from the Puget Sound listed and non-listed HGMP template (WDFW and NOAA 2003).

(1) Salmonid and non-salmonid fishes or species that could negatively impact the program: Lewis River coho fry and smolts can be preyed upon from release through the entire migration corridor from the river subbasin to the mainstem Columbia River and estuary. Northern pikeminnows (beginning at RM 4.0) and introduced spiny rays along the Columbia mainstem sloughs can predate on coho smolts as well as avian predators, including gulls, mergansers, cormorants, belted kingfishers, great blue herons and night herons. Mammals that can take a heavy toll on migrating smolts include river otters, while returning adults are preyed upon by harbor seals, sea lions and Orcas.

(2) Salmonid and non-salmonid fishes or species that could be negatively impacted by the program: Co-occurring natural salmon and steelhead populations in the Lewis River and tributary areas could be negatively impacted by program fish. Target populations would be the ESA listed endangered and threatened salmonids: Lower Columbia River Chinook salmon ESU (threatened), Columbia River chum salmon ESU (threatened), Lower Columbia River steelhead ESU (threatened) and proposed Lower Columbia Coho (candidate). Listed fish can be impacted thru a complex web of short and long term processes and over multiple time periods which makes evaluation of this a net effect difficult. WDFW is unaware of studies directly evaluating adverse

ecological effects to listed salmon. See also Section 2.2.3 Predation and Competition.

3) Salmonid and non-salmonid fishes or other species that could positively impact the program. Spawning Chinook, coho and winter steelhead occurs in this system. Non-salmonid fishes such as sculpins, lampreys and sucker also occur and could be potential prey items at larval stages. Carcasses from the returning adult salmonids have been found to elevate stream productivity through several pathways, including: 1) the releases of nutrients from decaying carcasses has been observed to stimulate primary productivity (Wipfli et al. 1998); 2) the decaying carcasses have been found to enrich the food base of aquatic invertebrates (Mathisen et al. 1988); and 3) juvenile salmonids have been observed to feed directly on the carcasses (Bilby et al. 1996). Addition of nutrients has been observed to increase the production of salmonids (Slaney and Ward 1993).

4) Salmonid and non-salmonid fishes or species that could be positively impacted by the program. Lewis River coho smolts can be preyed upon release through the entire migration corridor from the river subbasin to the mainstem Columbia River and estuary. Northern pikeminnows and introduced spiny rays in the Columbia mainstem sloughs can prey on coho smolts as well as avian predators, including gulls, mergansers, cormorants, belted kingfishers, great blue herons and night herons. Mammals that benefit from migrating smolts include river otters, while returning adults benefit harbor seals, sea lions and Orcas. Listed species in section 2 can prey upon fry from this program.

Section 4. Water Source

4.1 Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile and natural limitations to production attributable to the water source.

RSI programs operate in the streams from January to April. Individual tributary water flow data is not known, but by mid-winter most creek instream flows have been recharged thoughout the system. Fish First RSI sites have been located in areas where conditions for short term incubation would be successful.

Generally, local hydrologic conditions are poor throughout the watershed, with 10 out of 11 subwatersheds falling into the impaired category. Only Pup Creek, a tributary to Cedar Creek, is rated as moderately impaired (WRIA 27 LFA 2002). Temperature monitoring in Cedar Creek, a NF Lewis River tributary, is believed to represent other lower Lewis River tributaries. Data show that maximum stream temperatures often exceed 18 degrees and in some years minimum temperatures exceeded 20 degrees for a week. Water temperatures often exceed 16 degrees C during July and August, and sometimes reach near lethal temperatures for salmonids (23-25 degrees C, WRIA 27 LFA 2002). NOAA has indicated that when waters temperatures are elevated above 15 to 17.8 degrees Celsius, they are rated as poor for salmon. Reeves et al. (1989) indicated that when minimum water temperatures exceed 20 degrees C for two weeks or more, summer coho salmon parr production is detrimental. Water quality, especially high water temperatures, was identified as a major limiting factor within certain subbasins of WRIA 27. Water quantity was also identified as a limiting factor almost throughout WRIA 27. Both low flows that limit the rearing habitat and access and increased peak flows that alter instream habitat were considered significant problems in many of the subbasins.

4.2 Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.

- RSI sites have been chosen that provide a consistent source of water with minimal siltation problems.
- Water intake pipes are screened to prevent debris or fish from entering the incubator.
- Loadings into the barrel RSI's are less than 50% of capacity therefore reducing risk of dead eggs potentially spreading fungal problems to adjacent healthy eggs.
- Dead eggs or hatched fry can be removed and are disposed to prevent transmission through the discharge pipe.
- RSIs are checked regularly or more if needed due to significant rain events.

Section 5. Facilities

5.1 Broodstock collection facilities (or methods).

See Lewis River Type N coho HGMP

5.2 Fish transportation equipment (description of pen, tank, truck, or container used).

Eggs are incubated to eyed stage at the Lewis River Hatchery. By early February, eggs have developed to eyed stage and Fish First will arrange to pick up egg allotments and transport eyed eggs in wet burlap sacks by car or truck to the site.

5.3 Broodstock holding and spawning facilities.

See Lewis River Type N coho HGMP

5.4 Incubation facilities.

Eggs are incubated at Lewis River Hatchery in deep troughs and vertical stack incubators to the eyed egg stage. Eyed eggs are transferred to the Fish First RSI sites and placed in 55 gallon polyurethane barrels. Each barrel can safely accommodate up to 125,000 eggs but loadings are kept at 50,000 eggs with eggs divided onto two screen trays. Water flow regulation into the RSIs is accomplished by an in-line valve between the water sources and the barrel. Water flows into the barrel through a flow diffuser about one inch from the bottom, and flows out of the barrel a few inches from the top, creating an upwelling of water through artificial incubation substrate. Eggs are suspended on two trays above the substrate. In the barrel, an in-line stand pipe between the valve and the barrel allows the barrel to be rapidly drained without disturbing the eggs. Approximately 16 to 20" of artificial substrate is placed in the barrel as incubation substrate for alevins. Eyed eggs hatch and disperse within the artificial substrate which provides an appropriate environment for incubating sac fry. Upon yolk absorption, fry move up through the substrate and exit through the outlet pipe volitionally.

5.5 Rearing facilities.

Eyed eggs rear within the RSI incubator from hatching, yolk absorption to swim-up.

5.6 Acclimation/release facilities.

RSI s are used only to swim-up fry stage. Subsequently, fry need to rear to a yearling stage in the tributary or Lewis River mainstem.

5.7 Describe operational difficulties or disasters that led to significant fish mortality.

Flow disruption to the RSI can cause significant mortalities but no problems of this type have been reported by the operators (Fish First).

5.8 Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.

- Program uses multiple locations in the same system
- RSI sites have been chosen that provide a consistent source of water with minimal siltation problems.
- Water intake pipes are screened to prevent debris or fish from entering the incubator.
- Loadings into the RSI's are less than 50% of capacity therefore reducing risk of dead eggs potentially spreading fungal problems to adjacent healthy eggs.
- Dead eggs or hatched fry can be removed and are disposed to prevent transmission of diseases.
- RSIs are checked regularly or more if needed due to significant rain events.

Section 6. Broodstock Origin and Identity

6.1 Source.

Adults are hatchery fish trapped at Lewis River hatcheries.

6.2.1 History.

See Lewis River Type N coho HGMP

6.2.2 Annual size.

See Lewis River Type N coho HGMP

6.2.3 Past and proposed level of natural fish in the broodstock.

See Lewis River Type N coho HGMP

6.2.4 Genetic or ecological differences.

See Lewis River Type N coho HGMP

6.2.5 Reasons for choosing.

See Lewis River Type N coho HGMP

6.3 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.

See Lewis River Type N coho HGMP

Section 7. Broodstock Collection

7.1 Life-history stage to be collected (adults, eggs, or juveniles).

See Lewis River Type N coho HGMP

7.2 Collection or sampling design

See Lewis River Type N coho HGMP

7.3 Identity.

100% of the hatchery fish released are marked so that they can be distinguished from the natural population.

7.4 Proposed number to be collected:

7.4.1 Program goal (assuming 1:1 sex ratio for adults):
See Lewis River Type N coho HGMP

7.4.2 Broodstock collection levels for the last twelve years (e.g. 1990-2001), or for most recent years available.
See Lewis River Type N coho HGMP

7.5 Disposition of hatchery-origin fish collected in surplus of broodstock needs.

See Lewis River Type N coho HGMP

7.6 Fish transportation and holding methods.

NA

7.7 Describe fish health maintenance and sanitation procedures applied.

NA

7.8 Disposition of carcasses.

NA

7.9 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.

See Lewis River Type N coho HGMP

Section 8. Mating

8.1 Selection method.

See Lewis River Type N coho HGMP

8.2 Males.

See Lewis River Type N coho HGMP

8.3 Fertilization.

See Lewis River Type N coho HGMP

8.4 Cryopreserved gametes.

NA

8.5 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.

NA

Section 9. Incubation and Rearing.

9.1.1 Number of eggs taken and survival rates to eye-up and/or ponding.

See Lewis River Type N coho HGMP

9.1.2 Cause for, and disposition of surplus egg takes.

The FBD process sets forth egg takes to meet program goals Surplus eggs are not available for this program.

9.1.3 Loading densities applied during incubation.

Eggs are loaded at 25,000 eggs per tray (2 trays) in a 55 gallon barrel supplied with 2" diameter PVC pipe delivering 7-10 gpm.

9.1.4 Incubation conditions.

The program uses water sources that result in hatching/emergence timing similar to that of the naturally produced population. The intake pipe provides a steady stream of water to to the RSI.

9.1.5 Ponding.

Eggs are incubated in a manner that allows volitional emigration of fry. When fry are at free swimming stage they can exit the RSI via an outlet pipe back to the stream.

9.1.6 Fish health maintenance and monitoring.

Prior to transfer to the RSI sites, disinfection procedures are implemented during incubation at Lewis River that prevent pathogen transmission between stocks of fish on site. Following eye-up stage, eggs are inventoried, and dead or undeveloped eggs removed tp prevent fungal infection of healthy eggs and are disposed of in a manner that prevents transmission to receiving watershed.

9.1.7 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.

- From 220 – 500 temperature units, eyed eggs are resistance to shock during transportation, handling and loading of the eggs into the incubators.
- Eyed eggs can survive loss of water for extended periods of time and if due to silt or high water problems can be drained of water and kept moist until water conditions allow continued operations.
- Eggs and alevins are protected from predators until the free swimming stage.
- An additional tray can be used to minimize silt or sediment problems.
- Egg loss is monitored and dead eggs are removed to prevent fungal spread from one egg to another.
- Monitoring indicates that survival rates from eyed egg to fry is often better than 90% as compared to natural spawning survival rates of between 5% and 20%.

9.2.1 Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1990-2001), or for years dependable data are available.

Since program inception, average success of incubating eyed eggs to swim-up fry in the RSI units is approximately 98% for the Fish First program (pers.Comm. Gary Loomis 2004). See also section 1.12 for wild coho RSI smolt contribution potential.

9.2.2 Density and loading criteria (goals and actual levels).

Eggs are loaded at 25,000 eggs per tray (2 trays) in a 55 gallon barrel supplied with 2" diameter PVC pipe delivering 7-10 gpm. The 55 gallon RSI capacity is 125,000 eggs so the loading density within the unit is loaded at less than 50% of capacity to reduce crowding and risk.

9.2.3 Fish rearing conditions.

Fish rear in the RSIs only to the extent of absorbing the yolk sac from alevin stage to a free swimming stage. Egg swill hatch from 400 – 500 temperature units (TU - daily degree unit above 32 degrees F) and will take another 300 – 400 TU to free swim and egress from the RSI. At approximately 40-45 degrees F, the typical late winter stream temperatures in the Lewis river system, hatching will take 40-50 days and within another 30-40 days fry will be free swimming. Fish First volunteers monitor flow and debris which can block flow through the water intakes.

9.2.4 Indicate biweekly or monthly fish growth information (average program performance), including length, weight, and condition factor data collected during rearing, if available.

RSI programs do not feed fish. By the time coho develop are free swimming fry, they are about 38-39 mm fl in length and weigh about 0.4 grams (1200 – 1500 fish/lb). Subsequent growth to yearling smolt stage depends on water temperature and food availability.

Research from RSI projects on Snow and Andrews Creek located on the Olympic Penninsula indicate that coho fingerlings lengths reach 50 mm fl by mid-May and 60 mm fl by mid-June. Growth rates on RSI coho in the Lewis River system is dependent on water temperature and productivity specific to individual tributaries. Larger coho trapped from mid-April to early May indicate larger coho to be 85 – 105 mm fl.

9.2.5 Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.

RSI programs do not feed fish. By the time coho develop to free swimming fry, they are about 38-39 mm fl in length and weigh about 0.4 grams (900 – 1200 fish/lb). Subsequent growth to yearling smolt stage depends on water temperature and food availability.

Research from RSI projects on Snow and Andrews Creek located on the Olympic Penninsula indicate that coho fingerlings lengths reach 50 mm fl by mid-May and 60 mm fl by mid-June. Growth rates on RSI coho in the Lewis River system is dependent on water temperature and productivity specific to individual tributaries. Larger coho trapped from mid-April to early May indicate larger coho to be 85 – 105 mm fl.

9.2.6 Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).

Not applicable – unfed fry.

9.2.7 Fish health monitoring, disease treatment, and sanitation procedures.

Incubating eggs and alevins can be visually monitored for mortality or problems by Fish First staff. Subsequent egg or alevin mortality is disposed of to prevent transmission to the stream. After the program has concluded for the year, the RSI is removed, cleaned, disinfected and dried.

9.2.8 Smolt development indices (e.g. gill ATPase activity), if applicable.

Not applicable.

9.2.9 Indicate the use of "natural" rearing methods as applied in the program.

The program attempts to better mimic the natural rearing environment by allowing the fry to emigrate volitionally and rear naturally.

9.2.10 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation.

- RSI sites have been chosen that provide a consistent source of water with minimal siltation problems.
- Water intake pipes are screened to prevent debris or fish from entering the incubator.
- Loadings into the RSI's are less than 50% of capacity therefore reducing risk of dead eggs potentially spreading fungal problems to adjacent healthy eggs.
- Dead eggs or hatched fry can be removed and are disposed to prevent transmission.
- RSIs are checked regularly or more if needed due to significant rain events.

Section 10. Release

10.1 Proposed fish release levels.

Age Class	Max. No.	Size (ffp)	Release Date	Location			
				Stream	Release Point (RKm)	Major Water-shed	Eco-province
Unfed Fry	460,000	1,500	April	See section 1.11.2	See section 1.11.2	Lewis R.	Lower Col

10.2 Specific location(s) of proposed release(s).

See section 1.11.2

10.3 Actual numbers and sizes of fish released by age class through the program.

Up to 450,800 fry at 1500 fpp total based on 98% survival. Actual numbers are unknown although minimal losses are reported by Fish First staff.

10.4 Actual dates of release and description of release protocols.

Egressing fry move up through the substrate and exit through the outlet pipe volitionally staring in early March and continuing through early April depending on stream temperatures.

10.5 Fish transportation procedures, if applicable.

Not applicable.

10.6 Acclimation procedures (*methods applied and length of time*).

Un-fed fry are allowed to emigrate volitionally from the RSI sites.

10.7 Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.

Fry have not been otolith marked as eggs during incubation.

10.8 Disposition plans for fish identified at the time of release as surplus to programmed or approved levels

No surplus at the time of release. Only the “release” amount of eggs are allotted to each RSI site.

10.9 Fish health certification procedures applied pre-release.

Fish First staff monitoring the site will contact WDFW staff if any problems have been encountered and a fish health specialist can be consulted.

10.10 Emergency release procedures in response to flooding or water system failure.

None known at this time.

10.11 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.

- Volitional release during natural out-migration timing is practiced
- Size of fry egressing from RSIs are similar to the natural population of coho in the Lewis system
- Water intake pipes are screened to prevent debris or fish from entering the incubator.

Section 11. Monitoring and Evaluation of Performance Indicators

11.1.1 Describe plans and methods proposed to collect data necessary to respond to each "Performance Indicator" identified for the program.

Mandatory MOU and annual Volunteer Fish Production Project Records are tracked. Current RSI projects are not otolith marked but research on Cedar Creek (Lewis River) is ongoing using otolith marked eggs. WDFW will be able to RSI contribution of smolts and adults to the system and use those results to evaluate contribution of the Fish First RSIs in other parts of the Lewis River system.

11.1.2 Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

WDFW staff and programs are intact to track volunteer efforts as they are an integral part of the department. The Cedar Creek research is on-going with PacifiCorp contributions.

11.2 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.

Coho populations both wild and hatchery stocks are proposed for listings (NOAA 69 FR 33101; 6/14/2004). Direct monitoring or evaluation actiivites are not proposed for these programs outside of section 1.10.

Section 12. Research

12.1 Objective or purpose.

No research is proposed. Results from research and monitoring on Cedar Creek (Lewis River) is on-going and RSI performance or contributions to other RSI projects could be evaluated based on those findings. See Fish First Wild Coho RSI HGMP.

12.2 Cooperating and funding agencies.

NA

12.3 Principle investigator or project supervisor and staff.

NA

12.4 Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.

NA

12.5 Techniques: include capture methods, drugs, samples collected, tags applied.

NA

12.6 Dates or time periods in which research activity occurs.

NA

12.7 Care and maintenance of live fish or eggs, holding duration, transport methods.

NA

12.8 Expected type and effects of take and potential for injury or mortality.

NA

12.9 Level of take of listed fish: number of range or fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table 1).

NA

12.10 Alternative methods to achieve project objects.

NA

12.11 List species similar or related to the threatened species; provide number and causes of mortality related to this research project.

NA

12.12 Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury or mortality to listed fish as a result of the proposed research activities.

NA

Section 13. Attachments and Citations

13.1 Attachments and Citations

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Section 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

14.1 Certification Language and Signature of Responsible Party

"I hereby certify that the information provided is complete, true and correct to the best of my knowledge and belief. I understand that the information provided in this HGMP is submitted for the purpose of receiving limits from take prohibitions specified under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter for the proposed hatchery program, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973."

Name, Title, and Signature of Applicant:

Certified by_____ Date:_____

Take Table 1. Estimated listed salmonid take levels by hatchery activity.

Coho (proposed)

ESU/Population	Lower Columbia River Coho
Activity	Fish First Wild Coho (Lewis River) Program
Location of hatchery activity	Lewis/Merwin Hatchery
Dates of activity	November– January
Hatchery Program Operator	WDFW

Type of Take	Annual Take of Listed Fish by life Stage (number of fish)			
	Egg/Fry	Juvenile/ Smolt	Adult	Carcass
Observe or harass (a)				
Collect for transport (b)				
Capture, handle, and release (c)				
Capture, handle, tag/mark/tissue sample, and release (d)				
Removal (e.g., broodstock (e)			Up to 300	
Intentional lethal take (f)			Up to 300	
Unintentional lethal take (g)	Up to 38,400*			
Other take (specify) (h)				

* Based on 92% green egg to eyed egg survival.

a. Contact with listed fish through stream surveys, carcass and mark recovery projects, or migrational delay at weirs.

b. Take associated with weir or trapping operations where listed fish are captured and transported for release.

c. Take associated with weir or trapping operations where listed fish are captured, handled and released upstream or downstream.

d. Take occurring due to tagging and/or bio-sampling of fish collected through trapping operations prior to upstream or downstream release, or through carcass recovery programs.

e. Listed fish removed from the wild and collected for use as broodstock.

f. Intentional mortality of listed fish, usually as a result of spawning as broodstock.

g. Unintentional mortality of listed fish, including loss of fish during transport or holding prior to spawning or prior to release into the wild, or, for integrated programs, mortalities during incubation and rearing.

h. Other takes not identified above as a category.